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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/770,725	01/26/2001	Li Yang	791_130	6015

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EXAMINER	
CREPEAU, JONATHAN	
ART UNIT	**PAPER NUMBER**
1746	16

DATE MAILED: 11/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

CLO-16

Office Action Summary	Application No.	Applicant(s)	
	09/770,725	YANG ET AL.	
	Examiner	Art Unit	
	Jonathan S. Crepeau	1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 October 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Response to Amendment

1. This Office action addresses claims 1-17. The claims are newly rejected under 35 USC §103, as necessitated by amendment. Accordingly, this action is made final.

Claim Rejections - 35 USC § 103

2. Claims 1-7 and 12-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al (U.S. Patent 6,083,644) in view of Takami et al (U.S. Patent 6,350,544) in view of Omaru et al (U.S. Patent 6,277,522).

Regarding claims 1 and 17, Watanabe et al. is directed to a nonaqueous lithium secondary battery comprising a positive and negative electrode laminated through a separator (see abstract and Figure 1). Regarding claims 1, 2, and 17, the battery contains an electrolyte comprising lithium hexafluorophosphate (see col. 12, line 46). Regarding claims 1 and 17, as disclosed in column 14, lines 48-52, the positive electrode mixture and the negative electrode mixture both have moisture contents of 50 ppm or less. Therefore, the moisture content of both electrodes would inherently be lower than 5,000 ppm in case of heating the electrodes at 25 to 200°C, and lower than 1,500 ppm in case of heating at 200°C to 300°C, as recited in claims 1 and 17.

Watanabe et al. do not expressly teach that the positive electrode material is a lithium manganese oxide having a cubic spinel structure (e.g., $LiMn_2O_4$), as recited in claims 1, 3, 4, and

17, or that the negative electrode active material is a graphitized carbon fiber, as recited in claims 1, 5, 6, and 17.

In column 4, lines 48 and 49, Takami et al. teach a lithium battery comprising a positive electrode material comprising $LiMn_2O_4$.

In column 8, lines 13-21, Omaru et al. teach a negative electrode comprising a graphitized carbon fiber.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the disclosure of Takami et al. would motivate the artisan to use $LiMn_2O_4$ as the positive electrode material of Watanabe et al. In the cited passage, Takami et al. teach that $LiMn_2O_4$ is "preferable in view of obtaining a high voltage." Accordingly, the artisan would be motivated to use $LiMn_2O_4$ as the positive electrode material of Watanabe et al.

Furthermore, the disclosure of Omaru et al. would motivate the artisan to use graphitized carbon fiber as the negative electrode material of Watanabe et al. In the cited passage, Omaru et al. teach that graphitized fiber can be realized which has "strength tolerable to expansion/ contraction at the time of charge/discharge and high capacity." Accordingly, the artisan would be motivated to use graphitized carbon fiber as the negative electrode material of Watanabe et al.

Regarding claims 12-16, which recite that the battery is used in an electric automobile, these claims do not have to be accorded patentable weight because they recite an intended use and do not further limit the structure of the battery (MPEP §2114).

3. Claims 1-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yanai et al (U.S. Patent 6,235,426) in view of Watanabe et al. in view of Takami et al. in view of Omaru et al.

Regarding claims 1 and 17, Yanai et al. is directed to a nonaqueous lithium secondary battery comprising a positive and negative electrode laminated through a separator (see abstract and Figure 1). Regarding claims 1, 2, and 17, the battery contains an electrolyte comprising lithium hexafluorophosphate (see col. 8, line 42). Regarding claims 8-11, the battery has a capacity of 3.5 Ah (see Table 1).

Yanai et al. do not expressly teach the water content of each electrode as recited in claims 1 and 17, that the positive electrode material is a lithium manganese oxide having a cubic spinel structure (e.g., $LiMn_2O_4$) as recited in claims 1, 3, 4, and 17, or that the negative electrode active material is a graphitized carbon fiber, as recited in claims 1, 5, 6, and 17.

As set forth above, in column 4, lines 48 and 49, Takami et al. teach a lithium battery comprising a positive electrode material comprising $LiMn_2O_4$.

In column 8, lines 13-21, Omaru et al. teach a negative electrode comprising a graphitized carbon fiber.

In column 14, lines 48-52, Watanabe et al. teach that a positive electrode mixture and a negative electrode mixture both have moisture contents of 50 ppm or less.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the disclosure of Takami et al. would motivate the artisan to use $LiMn_2O_4$ as the positive electrode material of Yanai et al. In the cited passage,

Takami et al. teach that $LiMn_2O_4$ is "preferable in view of obtaining a high voltage." Accordingly, the artisan would be motivated to use $LiMn_2O_4$ as the positive electrode material of Yanai et al.

Furthermore, the disclosure of Omaru et al. would motivate the artisan to use graphitized carbon fiber as the negative electrode material of Yanai et al. In the cited passage, Omaru et al. teach that graphitized fiber can be realized which has "strength tolerable to expansion/ contraction at the time of charge/discharge and high capacity." Accordingly, the artisan would be motivated to use graphitized carbon fiber as the negative electrode material of Watanabe et al.

Furthermore, the disclosure of Watanabe et al. would motivate the artisan to use electrodes having a moisture content of less than 50 ppm in the battery of Yanai et al. In column 14, line 49 et seq., Watanabe et al. teach that it is "preferred...from the point of cycle property" that the electrodes have such a low moisture content. Additionally, the combined moisture content of the electrodes would inherently be lower than 5,000 ppm in case of heating the electrodes at 25 to 200°C, and lower than 1,500 ppm in case of heating at 200°C to 300°C, as recited in claims 1 and 17.

Regarding claims 12-16, these claims are not accorded patentable weight for the reasons set forth above (i.e., they do not further limit the structure of the battery).

Response to Arguments

4. Applicant's arguments filed October 7, 2003 have been fully considered but they are not persuasive. Applicants assert that Watanabe "fails to disclose or suggest any criticality of water

content in order to provide excellent performance such as excellent self-discharging efficiency, cycle properties, or the like." However, it is submitted that Watanabe does in fact identify the criticality of water content in the battery. As noted above, in column 14, line 49 et seq., Watanabe et al. teach that it is "preferred...from the point of cycle property" that the electrodes have a low moisture content.

Applicants further assert that Watanabe "fails to disclose or suggest a non-aqueous electrolytic solution containing a lithium compound and having a water concentration restricted to be the specific levels recited in claims 1 and 17 when the cell is exposed to the recited temperatures." In response, it is noted that claims 1 and 17 are concerned with the water content of the electrodes and not the water content of the electrolyte. Accordingly, an argument on such grounds is not germane to claims 1 and 17. Furthermore, the Examiner maintains the position that the water content of the electrodes of Watanabe would be below the claimed level in the event of being heated to the claimed temperatures. More particularly, it is maintained that the electrodes cannot contain more water than they initially contain. As such, the water content would always be at or below those levels identified by Watanabe, regardless of the temperature to which the battery and/or electrodes are heated.

Finally, Applicants assert that an artisan would not be motivated to use the lithium manganese oxide of Takami as the positive electrode material of Watanabe because the existing positive active material of Watanabe (i.e., lithium-containing titanium oxide or iron sulfide) is essential to attaining the objectives of Watanabe. In response, it is first noted that this argument is only germane to the first rejection set forth above, where Watanabe is used as a primary

reference, and not to the second rejection, where Watanabe is used as a secondary reference to modify Yanai et al. However, regarding the first rejection, it is the Examiner's position that the artisan would possess sufficient motivation to use the lithium manganese oxide disclosed by Takami as a portion or all of the positive active material of Watanabe. As set forth above, Takami teaches that such lithium manganese oxide provides a battery with a high voltage. The artisan would thus be motivated to replace some or all of the active material of Watanabe with lithium manganese oxide in hopes of attaining a higher voltage. As a skilled battery practitioner is well aware, trade-offs in battery properties exist among various active materials. Accordingly, it is not believed that Watanabe "teaches away" from using a high-voltage material such as lithium manganese oxide merely because it is concerned with materials having other favorable characteristics such as high capacity and low internal resistance. Accordingly, the rejection over Watanabe in view of Takami is believed to be proper and is maintained herein.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (703) 305-0051 (prior to December 17, 2003) or (571) 272-1299 (after December 17, 2003). The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (703) 308-4333. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900. Additionally, documents may be faxed to (703) 872-9310 (for non-final communications) or (703) 872-9311 (for after-final communications).

Any inquiry of general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

JSC

October 21, 2003

RANDY GULAKOWSKI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700